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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,817	10/13/2000	Masaki Fujiwara	NEC00P260-ki	7075

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/23/2002

9

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/689,817

Applicant(s)

FUJIWARA ET AL.

Examiner

Susy N Tsang-Foster

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 11-16 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3,4,6,7,9,10,18 and 19 is/are allowed.
- 6) ☒ Claim(s) 1,5,8 and 17 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-10, and 17-19 in Paper No. 7 is acknowledged.

2. Claims 11-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in Paper No. 7.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

4. The information disclosure statements filed on 10/13/2000 and 5/7/2001 have been considered by the Examiner.

### ***Drawings***

5. The drawings are objected to because in Figure 5, reference label 6 and reference label 7 appear to point to the same part in the Figure. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Specification*

6. The abstract of the disclosure is objected to because it contains grammatically awkward phrases such as "high freedom", and "large energy density". Correction is required. See MPEP § 608.01(b).

7. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: on page 2, line 10, "large energy density" should be "high energy density", and on page 2, line 19, the sentence "[c]onventional batteries had other problem" is grammatically awkward. The phrase "the battery comes to have" on page 2 is also grammatically awkward. Similarly, page 3 has the following grammatically awkward phrases "made low the freedom" and "high freedom". On page 11, it appears that "mode" should be "mold".

These examples are not exhaustive and applicants are required to review and correct the entire specification.

Appropriate correction is required.

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***Claim Objections***

8. Claim 2 is objected to because of the following informalities: In claim 2, the phrase “spaced each other” should be “spaced from each other”. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 6,299,653 B1) in view of Larkin (US 6,306,215 B1) and Boer et al. (US 5,656,393).

Hoshi et al. disclose a lithium battery (col. 21, line 19 to col. 22, line 15) wherein the positive electrode can comprise metal chalcogenides or organic compounds such as polypyrrole, polythiophene, polyaniline, and polyacetylene as the active material. Therein Hoshi et al. also disclose that the positive electrode can be produced by molding the above mentioned materials into predetermined morphologies and that a current collector is used as a substrate for the electrode. Hoshi et al. also disclose adding a conductivity enhancing agent to the positive electrode (col. 25, lines 5-20) and the thickness of the electrode material layer of a positive electrode is 110 microns.

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Hoshi et al. do not disclose that the molded positive electrode contains a plasticizer in the positive electrode material and that the thickness of the positive electrode material is 300 microns to 9 mm.

Larkin teaches that plasticizer in the electrode compositions facilitates the formation of the porous structure in the electrode which is extracted after the electrode is formed to form a porous electrode structure (col. 6, lines 28-50).

Boer et al. teach that the particular thickness of the active material layer of an electrode depends on the battery design and its acceptable drain rate and can be customized by the artisan (col. 8, lines 34-37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add plasticizer to the electrode material of Hoshi et al. in order to enable formation of a porous electrode structure in the electrode that aids in electrolyte permeability in the electrode that results in increased ionic conduction in the electrode.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to have the thickness of the positive electrode material be 300 microns to 9 mm because the thickness of the electrode active material layer depends on the application requirements of the battery such as the drain rate requirements and the battery design.

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 6,299,653 B1) in view of Larkin (US 6,306,215 B1) and Boer et al. (US 5,656,393) and as evidenced by Poehler et al. (US 5,637,421).

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Hoshi et al. in combination with Larkin and Boer et al. (see paragraph above) disclose all the limitations of claim 8 except explicitly disclosing that the electrode material has an unevenness at the surface of the molded electrode.

However, no electrode material surface is perfectly flat so there will inherently be some degree of unevenness on the surface of the electrode material in the electrode.

As evidenced by Poehler et al., a film of polypyrrole active material inherently has a rough surface (col. 6, lines 28-37).

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 6,299,653 B1) in view of Larkin (US 6,306,215 B1) and Boer et al. (US 5,656,393).

Hoshi et al. disclose a lithium battery (col. 21, line 19 to col. 22, line 15) wherein the positive electrode can comprise metal chalcogenides or organic compounds such as polypyrrole, polythiophene, polyaniline, and polyacetylene as the active material. Therein Hoshi et al. also disclose that the positive electrode can be produced by molding the above mentioned materials into predetermined morphologies and that a current collector is used as a substrate for the electrode. Hoshi et al. also disclose adding a conductivity enhancing agent to the positive electrode (col. 25, lines 5-20) and the thickness of the electrode material layer of a positive electrode is 110 microns.

Hoshi et al. do not disclose that the molded positive electrode contains a plasticizer in the positive electrode material and that the thickness of the positive electrode material is 300 microns to 9 mm, and that the amount of plasticizer in the positive electrode is 2 to 15% by weight of the total of the electrode material.

Larkin teaches that plasticizer in the electrode compositions facilitates the formation of the porous structure in the electrode which is extracted after the electrode is formed to form a porous electrode structure (col. 6, lines 28-50) and that the amount of plasticizer is from about 1 to 50 by weight ratio to the polymer matrix in the electrode (col. 6, lines 43-50) and amount of polymer matrix (binder) in the electrode is from about 1 to 20% by weight of the electrode (col. 10, lines 30-43). Calculations would indicate that the upper limit of the amount of plasticizer in the electrode by weight would be 0.5 to 10 weight %.

Boer et al. teach that the particular thickness of the active material layer of an electrode depends on the battery design and its acceptable drain rate and can be customized by the artisan (col. 8, lines 34-37).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add plasticizer to the electrode material of Hoshi et al. in order to enable formation of a porous electrode structure in the electrode that aids in electrolyte permeability in the electrode that results in increased ionic conduction in the electrode.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to add plasticizer in the amount of 0.5 to 10% by weight of the electrode because this amount is effective to form a porous electrode structure in the electrode that aids in ionic conduction in the electrode as a result of increased permeability of the electrolyte in the electrode.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to have the thickness of the positive electrode material be 300 microns to 9

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mm because the thickness of the electrode active material layer depends on the application requirements of the battery such as the drain rate requirements and the battery design.

*Allowable Subject Matter*

13. Claims 3, 4, 6, 7, 9, 10, 18, and 19 are allowed.
14. Claim 2 would also be allowable if the above objection is addressed.
15. The following is a statement of reasons for the indication of allowable subject matter:

The present invention claims a molded electrode comprising: a) an electrode material that comprises a polymer active material, a conductivity enhancing agent, and a plasticizer; b) a plurality of current collector sheets; the electrode material and the current collector sheets are formed into one piece and the current collector sheets are spaced from each other in the thickness direction of the electrode (applies to claims 2, 6, 9, and 18).

The present invention also claims a molded electrode comprising: a) an electrode material that comprises a polymer active material, a conductivity enhancing agent, and a plasticizer; b) at least one current collector sheet; the electrode material and the current collector sheet are formed into one piece and the ratio of the volume of the electrode material and the volume of the current collector sheet is 30:1 to 100:1 provided the volume of the terminal portion of the current collector sheet is excluded from the volume of the current collector sheet (applies to claims 3, 4, 7, 10, and 19).

The closest prior art of record, Hoshi et al. (US 6,299,653 B1) discloses a molded electrode comprising a polymer active material and a current collector but does not disclose, teach or suggest any of the following features: 1) that the molded electrode comprises a plurality

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of current collector sheets; the electrode material and the current collector sheets are formed into one piece and the current collector sheets are spaced from each other in the thickness direction of the electrode or 2) that the ratio of the volume of the electrode material and the volume of the current collector sheet in the molded electrode is 30:1 to 100:1 provided the volume of the terminal portion of the current collector sheet is excluded from the volume of the current collector sheet

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9310 for regular communications and (703) 872-9311 for After-Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/20 October 2002

*Susy Tsang-Foster*